

We claim:

- 5 1. A continuously operated process for the purification by distillation of the oxirane formed in the oxirane synthesis by reaction of a hydroperoxide with an organic compound, wherein the crude oxirane is separated in a dividing wall column into low-, intermediate- and high-boiling fractions and the oxirane is taken off as intermediate boiler at the side offtake.
- 10 2. A process as claimed in claim 1, wherein the dividing wall column is configured as thermally coupled columns.
- 15 3. A process as claimed in claim 1 or 2, wherein the dividing wall column has from 30 to 120 theoretical plates.
- 20 4. A process as claimed in any of claims 1 to 3, wherein the distillation is carried out at a temperature of from 35 to 110°C and a pressure of from 1 to 10 bar, with the temperature being measured at the side offtake and the pressure being measured at the top of the column.
- 25 5. A process as claimed in any of claims 1 to 4, wherein no impurity is present in the oxirane in a concentration of above 0.1% by weight or the sum of all impurities is not greater than 0.1% by weight.
- 30 6. A process as claimed in any of claims 1 to 5, wherein the oxirane is prepared by a process comprising at least the steps (i) to (iii):
- 35 (i) reaction of the hydroperoxide with the organic compound to give a product mixture comprising the reacted organic compound and unreacted hydroperoxide,
- (ii) separation of the unreacted hydroperoxide from the mixture resulting from step (i),
- (iii) reaction of the hydroperoxide which has been separated off in step (ii) with the organic compound.

7. A process as claimed in claim 6, wherein an isothermal fixed-bed reactor is used in step (i), an adiabatic fixed-bed reactor is used in step (iii) and a separation apparatus is used in step (ii).
- 5 8. A process as claimed in any of claims 1 to 7, wherein the hydroperoxide used is hydrogen peroxide and the organic compound used is propylene and the reaction occurs over a heterogeneous catalyst to form propylene oxide as oxirane.
- 10 9. A process as claimed in claim 8, wherein the heterogeneous catalyst used is the zeolite TS-1.
10. An apparatus for carrying out a continuously operated process for the purification by distillation of the oxirane formed in the oxirane synthesis by reaction of a hydroperoxide with an organic compound, which comprises at least one isothermal reactor and one adiabatic reactor as well as a separation apparatus for preparing the oxirane as defined in claim 7 and a dividing wall column for purifying the oxirane by distillation.
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